

Claims

1. A dispensing nozzle comprising:

- (i) an elongate nozzle body having a base portion and a dispensing end;
- 5 (ii) an internal conduit in the nozzle body for delivering product from the base portion to the dispensing end;
- (iii) engaging formations on the nozzle for inter-engaging with co-operating engaging formations on a cap, to hold said cap in a position over-fitting the nozzle; and
- 10 (iv) an external ramp on the nozzle body and against which a co-operating portion on the cap may act, to provide sufficient relative separation force between the cap and the nozzle body, to separate the engaging formations on the cap and the nozzle from an inter-engaged position.

15 2. A nozzle according to claim 1 wherein the separating force of the co-operating surface and the external ramp is provided by the action of relative rotation of the cap and the nozzle in at least one direction.

20 3. A nozzle according to claim 1 or claim 2 wherein the ramp comprises a ramping surface oblique to the direction of rotation of the cap.

25 4. A nozzle according to any preceding claim wherein the separating force of the co-operating surface and the external ramp is provided by the action of relative rotation of the cap and the nozzle in two opposing directions.

5. A nozzle according to claim 4 wherein the ramp comprises two opposing ramp surfaces which are oblique to the direction of rotation of the cap.

30 6. A nozzle according to any one of claims 2 to 5 wherein the relative rotation required to effect separation is less than about 90° .

7. A nozzle according to any one of claims 2 to 6 wherein the relative rotation required to effect separation is less than about 80° .

5 8. A nozzle according to any one of claims 2 to 7 wherein the relative rotation required to effect separation is less than about 60° .

9. A nozzle according to any one of claims 2 to 8 wherein the ramp is provided by a ramp surface on an external shoulder defined on the nozzle body.

10 10. A nozzle according to claim 9 wherein the external shoulder is defined on a bridging portion on the nozzle, which bridges two portions of the nozzle having different diameters.

15 11. A nozzle according to claim 9 or claim 10 wherein the shoulder provides a surface circumferentially disposed about at least a portion of a longitudinal axis of the nozzle body.

12. A nozzle according to claim 11 wherein the orientation of the surface is substantially transverse to the longitudinal axis of the nozzle body.

20 13. A nozzle according to any preceding claim wherein the ramp comprises a ramp surface with a first portion and a second portion arranged so that movement along the ramp from the first to the second portion will provide a desired lift.

25 14. A nozzle according to any preceding claim in which the ramp comprises two opposing ramp surfaces arranged to meet contiguously at lower ends thereof.

30 15. A nozzle according to any preceding claim wherein the ramp is curved about a longitudinal axis of the nozzle so as to follow the travel path of the co-operating portion on the cap of the nozzle.

16. A nozzle according to any preceding claim wherein the ramp is provided on a circumferentially arranged ridge portion which is spaced from, and extends about, a wall portion of the nozzle portion.

5

17. A nozzle according to any preceding claim wherein the ramp is arranged so as to be clearly visible to a user in both the disengaged or inter-engaged position.

10

18. A nozzle according to any preceding claim wherein the nozzle inter-engages with the cap in a push fit manner.

19. A nozzle according to claim 18 wherein the nozzle inter-engages with the cap in a snap-fit arrangement.

15

20. A nozzle according to claim 18 or claim 19 wherein the nozzle additionally inter-engages with the cap in a twist-fit arrangement.

21. A nozzle according to any preceding claim wherein first and second ramps are provided longitudinally spaced apart along the nozzle body.

20

22. A nozzle according to claim 21 wherein snap-fit formations on the nozzle body are arranged on the nozzle body between said first and second ramps.

25

23. A nozzle according to any preceding claim wherein first and second ramps are provided transversely spaced apart on the nozzle body.

24. A nozzle according to any one of claims 21 to 23 wherein said first and second ramps are provided on a shoulder on the nozzle.

30

25. A nozzle according to any one of claims 21 to 24 wherein a further co-operating portion of the cap is arranged to act against said second ramp.

26. A nozzle according to any preceding claim comprising at least one further external ramp on the nozzle body against which internal longitudinal ribs running along the internal cap body may act.

5

27. A cap for overfitting a dispensing nozzle comprising:

(i) a first closed end;

(ii) a housing for receiving an elongate nozzle body and defining a second open end;

10

(iii) engaging formations on the cap for inter-engaging with co-operating engaging formations on the nozzle, to hold said cap in a position overfitting the nozzle; and

(iii) a mouth about the open end;

15

at least one co-operating portion on the cap arranged to act on a ramping surface of the nozzle when overfitted on the nozzle so as to provide sufficient relative separation force between the cap and the nozzle body, to separate the engaging formations on the cap and the nozzle from an inter-engaged position.

20

28. A cap according to claim 27 wherein said at least one co-operating portion projection is shaped to mate with the ramp surface.

29. A cap according to claim 27 or 28 wherein the separating force of the co-operating surface and the external ramp is provided by the action of relative

25

rotation of the cap and the nozzle in at least one direction.

30. A cap according to any one of claims 27 to 29 wherein the separating force of the co-operating surface and the external ramp is provided by the action of relative rotation of the cap and the nozzle in two opposing directions.

30

31. A cap according to claim 29 or 30 wherein the relative rotation required to effect separation is less than about 90°.

5 32. A cap according to any one of claims 29 to 31 wherein the relative rotation required to effect separation is less than about 80°.

33. A cap according to any one of claims 29 to 32 wherein the relative rotation required to effect separation is less than about 60°.

10 34. A cap according to any one of claims 27 to 33 wherein said at least one co-operating portion is of a convex shape.

35. A cap according to any one of claims 27 to 34 wherein said at least one co-operating portion is in the form of a projection.

15 36. A cap according to any one of claims 27 to 35 wherein the travel path of the co-operating portion on the cap is a circumferential path about the nozzle.

20 37. A cap according to any one of claims 27 to 36 comprising two opposing co-operating portions provided on the cap.

38. A cap according to any one of claims 27 to 37 comprising internal inter-engaging formation for inter-engaging with formations located externally on the nozzle.

25 39. A cap according to any one of claims 27 to 38 comprising a further co-operating portion on the cap for co-operating with a further ramp on the nozzle.

30 40. A cap according to claim 39 wherein the further co-operating portion of the cap is provided on an internal shoulder.

41. A cap according to any one of claims 27 to 40 further comprising at least one internal longitudinal rib running along the internal cap body from the closed end toward the open end.

5 42. A cap according to any one of claims 27 to 41 further comprising at least two internal longitudinal ribs spaced apart within the cap body and running along the internal cap body from the closed end toward the open end thereof.

43. A cap according to any one of claims 27 to 42 further comprising a pin within
10 the housing attached at one end to the cap and having a free end projecting toward the open end of the cap.

44. A cap according to any one of claims 27 to 43 arranged to overfit and inter-engage with a nozzle according to any one of claims 1 to 26.

15 45. A nozzle according to any one of claims 1 to 26 arranged to have overfitted thereto and inter-engaged therewith a cap according to any one of claims 27 to 44.

20 46. An assembly comprising a cap as defined in claim 44 overfitted on and engaged with a nozzle as defined in claim 45.

47. A container having integrally formed therewith a nozzle as defined in any one of claims 1 to 26, the nozzle arranged for dispensing dispensable product from
25 the container.

48. A container having attached thereto a nozzle as defined in any one of claims 1 to 26, the nozzle arranged for dispensing dispensable product from the
30 container.

49. A container according to claim 47 or 48 further comprising a cap as defined in claim 44 overfitted on and engaged with the nozzle.

49. A container according to any one of claims 47 to 48 containing therein a
5 curable product.

50. A container according to claim 49 wherein the curable product is an adhesive product.

10 51. A container according to claim 50 wherein the adhesive is a cyanoacrylate adhesive.